





Student Financial Assistance

Configuration Management

Process Guide



Document History

All revisions made to this document are listed here in chronological order.

Version Number	Date Modified	Name	Description



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1.0 Introduction

Configuration Management (CM) is the process of identifying, organizing and managing the integrity of the project work products throughout the project's life cycle. This includes software and non-software components. In general, configuration management should be applied to any item whose loss will put SFA systems at risk.

CM is performed at the Enterprise and Project Levels within SFA in accordance with the SFA Configuration Management Policy. *The SFA CM Policy is included for reference in Appendix A.*

The benefits of configuration management include:

- CM can be used for software and non-software rollout projects.
- Reduced errors due to lost data and use of obsolete and/or conflicting information across the enterprise and projects
- Integrity of software and other critical work products is maintained throughout the development life cycle
- · Project work products are identified and controlled
- Version histories are established
- Packaged configurations are readily available
- Consistent delivery of solutions on time with improved quality

This document describes the steps required to implement Configuration Management across SFA.

1.1 Overview of Configuration Management and SDLC

Configuration Management is a process for managing change to software or system projects within an organization. Configuration Management refers to the processes, tools, and resources required ensuring consistency and integrity between configuration items and their environment as they change over time. Configuration Management is implemented at the project level and the Enterprise level. Project level CM manages changes to projects that affect one particular system only and does not impact other systems. Enterprise level Configuration Management handles projects that affect multiple systems.

There are CM processes performed throughout the phases of the SDLC at the project level and Enterprise level. The following is a description of CM processes to follow when implementing a CM plan throughout the SDLC:



At the Vision phase of the SDLC:

- **Assign CM Lead** a CM lead is needed at the project level and Enterprise level. The roles and responsibilities are different for the CM Lead at the project level and the Enterprise level (see 2.1.1 Assign Configuration Management Roles and the Enterprise CM Plan for specific roles and responsibilities)
- **Begin a draft of the CM Plan** The draft of the CM plan should include a general idea of what is needed for the CM Plan. The CM Plan should include a brief description of the following CM processes for the project (*see 2.1.4 Document Configuration Management Plan*):
 - Configuration Identification (Identify work products, or configuration items essential to the project, i.e. requirements documents, design documents, testing documents, source code and technical architecture components)
 - □ Configuration Control (Change Control) (the process of making change decisions)
 - □ Configuration Status Accounting (The administrative process for tracking and reporting of all configuration items)
 - □ Configuration baseline auditing (the process of auditing the baseline to insure it is properly maintained and insure that the CM policies and procedures are followed)

At the Definition Phase of the SDLC:

- **Finalize CM Plan** update the Vision phase Draft CM Plan and finalize before the Construction phase.
- Train CM The CM lead ensures CM support staff and project team members are familiar with CM and their roles and responsibilities (see 2.1.3 Train Configuration Management)
- **Establish a Change Control group** (see 2.1.2 Establish a Change Control group). The Change Control group manages change and retains authority for deciding what proposed changes are incorporated in a work product, or configuration item.
- **Develop a Configuration Item (CI) Identification System** establish a Configuration Item Library, and baseline Configuration Items
- **Control Configuration Changes** by establishing a change control process and insuring that changes are baselined and stored in the Configuration Item Library
- **Status Accounting** Administrative tracking and reporting of all configuration items. (*see 2.2.3 Configuration Status Accounting*)



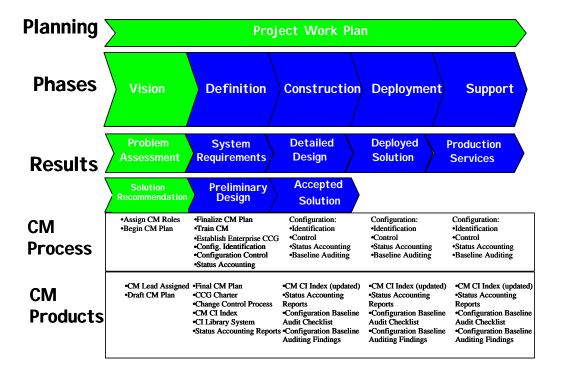
At the Construction, Deployment, and Support Phases of the SDLC:

- **Change Control Process** raise all desired changes to the CCG for resolution
- **Update CM CI index** update configuration items and the configuration item index and library
- **Status Accounting** continue to perform the administrative tracking and reporting of all configuration items
- **Baseline Auditing** perform audits to insure the change control storage process is being properly followed (*see 2.2.4 Configuration Baseline Auditing*)



2.0 **Configuration Management Process**

Project Configuration Management is performed throughout the Systems Development Life Cycle (SDLC). The diagram below highlights where the processes are performed in the SDLC.



Enterprise Configuration Management occurs any time a Project Change Control Group has a multi-project challenge that must be escalated to a higher organization for resolution.

2.1 **Plan Configuration Management**

2.1.1 Assign Configuration Management Roles

Assigning Configuration Management Leadership is crucial to the effective implementation of CM. CM Leads are needed at both the Enterprise and Project Levels. The following describes the leadership roles that should be assigned for Configuration Management at the Enterprise and Project levels.



Enterprise CM Lead - The Enterprise CM Lead implements the CM processes at the Enterprise level, establishes the Enterprise CM plan, serves as the Secretariat for the Enterprise level Change Control Group, and conducts periodic CM audits of project level software baselines and CM activities. The Deputy CIO for eCommerce Application Development (eCAD) designates the Enterprise CM Lead.

<u>IPT Project Manager</u> – The IPT Manager leads the Integrated Product Team and has overall responsibility for ensuring that Configuration Management is implemented for the project. The IPT Project Manager ensures that a Project CM Lead is assigned to the project.

Project CM Lead(s) - Essential to the beginning of project activities is the assignment of overall Configuration Management responsibilities to a Project CM Lead. The Project CM Lead manages the CM process activities and is ultimately responsible for all CM activities performed for the Project. Given the level of effort required, the Project CM Lead may acquire additional staffing to support the Project CM efforts. The staffing and time allocation requirements are directly related to the project size, complexity, and risk. The Project CM Lead prepares the Project CM plan, establishes the Project Change Control Group and ensures that the project adheres to the SFA CM Policy and Process.

2.1.2 Establish a Change Control Group

A Change Control Group (CCG) serves as the focal point for change management and retains the authority for deciding which proposed changes actually get incorporated in a work product. Change Control Groups are needed at the Enterprise and Project Levels within SFA. Only one Change Control Group exists at the Enterprise Level within SFA and multiple CCGs will exist at the Project Level (i.e. one per project).

Enterprise CCG - Any project level changes that impact multiple systems or system interfaces should be reviewed for approval by the Enterprise CCG. The Enterprise CCG consists of representatives for Modernization IT initiatives and legacy system owners. The CIO designates the Enterprise CCG Chairperson. The Enterprise CM lead performs the Secretariat function for the Enterprise CCG.

Project CCG(s) – Each project establishes a CCG to control changes to baselines that are within the project's scope. The size of the CCG will depend upon the project size, complexity, and scope. The Project CM Lead together with the IPT Project Manager establishes the Project CCG. For a particular project the CCG may include the Executive Sponsor, IPT Project Manager, End-User representative, Project CIO Representative, System Security Officer, Quality Assurance Lead, Development Lead, and/or Documentation Lead. The Project CM Lead may perform or assign the Secretariat role for the CCG.



2.1.3 Train Configuration Management

The Project CM Lead ensures that all CM support staff and project members are familiar with CM and their roles and responsibilities in carrying out the CM plan. Each CM team member and project member should receive instructions relevant to their responsibilities and how to carry them out.

2.1.4 Document Configuration Management Plan

As defined in the SFA Systems Development Life Cycle (SDLC), each Project should document a Configuration Management (CM) Plan as apart of the Project Work Plan. Although specific CM activities may not be known, the Project should begin the CM Plan in the Vision Phase of the SDLC. The CM plan should be updated during the Definition phase and finalized before the Construction phase. The CM Plan is approved by the IPT Project Manager in conjunction with the sign-off of the Project Work Plan by the Executive Sponsor. *A CM plan template is included for reference in Appendix A.* The CM plan should include a brief description of the following CM processes for the project:

- Configuration Identification
- Configuration Control (i.e. Change Control)
- Configuration Status Accounting
- Configuration Baseline Auditing

The CM plan must be maintained through the Support phase of the project life cycle. The CM plan is a living document and represents the most up-to-date configuration management activities on a project. The CM lead is responsible for maintaining the CM plan.



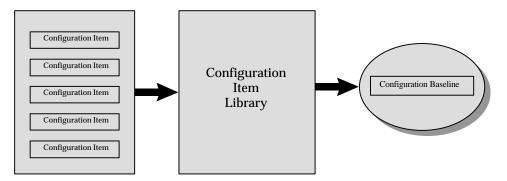
2.2 Perform Configuration Management

2.2.1 Configuration Identification

The objective of managing configuration items is to identify, control, and make available baselined configurations. *Configuration items* are work products, such as requirements, designs, testing documents, source code and technical architecture components. A *configuration* is composed of multiple configuration items. A release of a project would be considered a configuration.

A *baseline* is a specification or product that has been formally reviewed and agreed upon, that thereafter serves as the basis for further development, and that can be changed only through formal change control procedures. A *configuration baseline* is a group of baselined configuration items that are packaged for release. A *configuration item library* is a repository for storing configuration items and their associated records.

The flow of configuration items through a Configuration Item Library to form a configuration baseline is illustrated in the diagram below:



Configuration Identification includes procedures to Identify Configuration Items; Establish a Configuration Item Library and Baseline Configuration Items.

1. Identify Configuration Items

The CM Lead along with the IPT Development Project Manager should identify configuration items for the project. This is an ongoing activity performed throughout the project life cycle. The CM Lead should document all configuration items in the configuration item index of the Configuration Management Plan. *A Configuration Item Index template is included for reference in Appendix A.* The index is just an inventory of configuration items.



2. Establish a Configuration Item Library

Critical to the management of configuration items is the establishment or access to a configuration item library. Configuration Item Library systems are tools and procedures used to store and access environments for development and storage of configuration items. The CM Lead should consider the following when establishing or selecting a library system:

- A configuration item requires multiple environments. At a minimum, configuration items require a build, and baseline environment. The baselined environment contains configuration items that may be packaged for release.
- Each library requires access privileges and restrictions. The build environment (draft items not approved) has the least control, if any, whereas baseline environments have protective restrictions and strict check in/out procedures.
- Each library requires a disaster recovery plan. Frequent backups and archived configurations are required to save a project from unforeseen catastrophe.

Once the configuration item library is established, the CM Lead should ensure that procedures are implemented for storage and migration between environments. The CM Lead should adopt and document standards in Configuration Identification section of the CM Plan. At a minimum the CM Plan should cover the following standards.

- Naming and identification standards for configuration items.
- Migration standards for the movement of configuration items from one environment to the next.
- Change and version control standards to trace the change of a configuration item.

3. Baseline Configuration Items

When a configuration item is complete and approved, the CM Lead should ensure that it is migrated to the baseline environment. Baselining usually occurs to a collection of configuration items rather than individual configuration items. For example, at the end of design, all detailed design deliverables are baselined. Baselining usually occurs at the end of a life cycle phase or review. The IPT Development Manager and the configuration lead should determine and document when baselining would occur within the project schedule.



2.2.2 Configuration Control

Once the configuration item is baselined, all changes to the baseline must be controlled. Configuration Control includes procedures for changing and controlling configuration items.

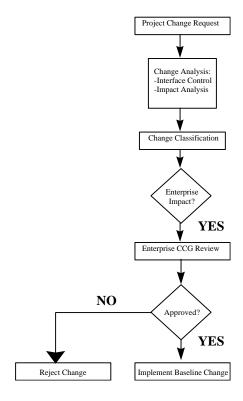
1. Change Configuration Items

At the Project Level, the CM Lead establishes a change control process that is specific to the needs of the project and interfaces with the Enterprise Level. At the Enterprise Level, the Enterprise CM Lead prepares a change control process for the Enterprise CCG that interfaces with the project. The Enterprise level process is reviewed and approved by the Enterprise CCG. Changes that impact multiple systems or interfaces are reviewed at the Enterprise Level. Changes that do not impact other systems are reviewed at the Project Level. Changes approved by the Enterprise CCG are implemented by the affected Projects.

In general, a CM Lead must ensure that a formal change control process is documented and followed. The change control process should establish an audit trail of baseline changes and define how change requests are reviewed and authorized by the Change Control Group. The process should include activities for tracking and classifying change requests, conducting impact analyses and obtaining formal approvals. Change control is performed throughout the project life cycle, especially during testing. The CM Lead must ensure that all project and CCG members are familiar with and adhere to the change control process.

The complexity of the change control process is directly related to the complexity and risk to the configuration item. For example, the change control activities for standards documentation may amount to only a few simple steps with little oversight. In contrast, the activities for source code change control would have many steps and multi-level oversight. There are however, some basic components to a change control process. An example of an Enterprise change control process is shown in the following diagram:





2. Control Configuration Items

As configuration items are baselined, they are stored in the project's configuration management library using a configuration management tool. The CM Lead should identify the tools and methods used for storing configuration items in the project CM Plan.

2.2.3 Configuration Status Accounting

Configuration Status Accounting is the administrative tracking and reporting of all configuration items. Configuration Status Accounting ties together all other CM functions: configuration identification, configuration control, and configuration audit. It also ensures the storage of CM activity information for subsequent retrieval and reporting.

The Enterprise CM Lead ensures that information is collected about the Enterprise change requests, approvals, and implementation. The Enterprise CM Lead also reports statuses to the Enterprise CCG, affected projects and senior management.

Throughout the project life cycle, the Project CM Lead must ensure that project information is collected about the system under development and is reported back to applicable groups and individuals, including the IPT Project Manager and senior management.



Configuration Status Accounting includes a series of predefined and ad-hoc reports on the status and trends of items controlled through configuration management. In general, the CM Lead should identify the reports that the project will produce in the CM Plan. A sample set of standard reports include:

- Change Control Group Meeting minutes
- Trouble Report summary and status
- Summary of changes made to baselines
- · List and revision history of configuration items
- Baseline Status Report
- Results of baseline audits
- Count and trends of open and closed change requests
- Count and trends of the status of change requests
- Count of open change request by severity
- Count of resolved change request

2.2.4 Configuration Baseline Auditing

Configuration management audits ensure that the CM policies and procedures are followed. The purpose of the audit is to identify deficiencies, provide improvements, and ensure compliance with standards. An audit will also provide feedback to senior management about the status of configuration management activities.

1. Conduct Configuration Management Audit

The Enterprise CM Lead, together with the Project CM Lead periodically audits the project to ensure that configuration management objectives are achieved. The CM Lead should prepare for the configuration management audit by identifying the checkpoint information in the Configuration Management Audit Checklist prior to performing the audit. A Configuration Management Audit Checklist template is included for reference in Appendix A.

Using formal audit procedures, the CM Leads:

- Assess the integrity of baselines
- Review the structure and environment of the CM Library
- Verify the completeness and correctness of the baseline library contents
- Verify Compliance with SFA Configuration Management Policy and Process

2. Report CM Audit Results

Following the configuration audit, the CM Leads prepare a report summarizing the audit findings. The report should include the completed audit checklist and be distributed to the IPT members, IPT Project Manager, and senior management, as needed. The CM Audit report indicates areas for improvement as well as required follow-up audits to ensure compliance. The CM Lead ensures that action items from the audit are tracked to closure.



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Configuration Management Plan Template

Client:	
Project:	
Project Manager:	
Configuration Lead:	
Implementation Date:	

Document History

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Author	Date	Version	Description
[name]	dd=mmm=yy	[number]	[short description]



Configuration Management Plan Template (page 2)

The goal of the CM plan is to present a general approach for conducting CM activities. It should be specific only to the point that it will indicate goals and expectations. It should not go into the level of detail that would require constant updating as detailed procedures change. Detailed procedures will exist outside of this document, however, they will be referenced. The CM plan can be integrated with the quality plan or can be a separate document.

Purpose and Scope

(Define the high-level objective and scope of configuration management activities to be performed on the project)

**Please reference the name and location of any supporting documentation.

Organization and Responsibilities and Resources

(Document the configuration management team organization and responsibilities. Identify the Budget needed for CM activity, Staff required, specific tools and unique facility requirements.)

**Please reference the name and location of any supporting documentation.

CM Activities

(Briefly describe the *general* approach for conducting the following CM activities. Do not go into a detailed description in this document. For versioning and easier maintenance purposes, document the detailed procedures outside of the CM plan and reference that documentation with a brief summary in the CM plan.)

**Please reference the name and location of any supporting documentation.

Configuration Identification

Configuration Control

Configuration Status Accounting

Configuration Auditing



Configuration Management Plan Template (page 3)

Schedule – (Audits and Reports)

(Document the schedule for the baseline audits and other major CM activities detailed in section 3.)

**Please reference the name and location of any supporting documentation.

Name of CM activity (Report, Audit, etc.)	SDLC Phase	Scheduled completion date
	Vision	
	Definition	
	Construction	
	Deployment	
	Support	

Appendix A – Document References and Definitions

Identify all referenced documents definitions associated abbreviations and acronyms

Reference Document	Location (LAN)	Document Description
[name]	[number]	[short description]

Definitions Acronyms and Abbreviations

Word/Abbreviation	Description
[name]	[short description]



Sample Configuration Item Identification Index Template

Executive Sponsor:	
Project Name:	
Project Manager:	
Configuration Manager:	

Configuration Item Name	Owner	Location(s)	Location Type/Description/Comments
Configuration Item (CI)	Each CI has	Project Repository	Project Baseline Document
	an owner		
	(team		
	member).		
SDLC Minimum			
Deliverables to be managed			
and controlled			
Business Case			
Business Performance			
model			
Approved Statement of Objectives			
Definition			
Business Capability Requirements			
Preliminary Design			
Document Functional Requirements			
Technical Requirements			



Out of the Albandaian	
Creation/Revision	
Topical outline document	
Completed first version	
Editorial review	
Final version before printing	
Distribution	
Review of first trial print run	
Cutover plan	
Cutover processes	
Support	
Release Plan	
Document management	
Change processes	
Security plan	
Disaster Recovery plan	
General/Budget	
Document work plan (and all sub plans)	
User Training plan	
Application documentation	
Process documentation	
Procedure Documentation	
Configuration management plan	
Quality Plan	



Tools		
CI Administration (tools used by		
CI team)		
 Metrics Tool 		
 Change Request Tool 		



Client: Project:

Project Manager:				
Configuration Manager:				
Release Date:				
				
Complete the following checklist—make which is applicable, requires a comment compliance to check "Yes." Otherwise, compliance. This form will be the basis	to exp check "	lain th 'No" a	e findi nd ide	ng. All items reviewed must be in ntify which items are not in
Checkpoints	Yes	No	n/a	Comments/Ref Info.
CM strategy documented				
CM Manager Identified				
CM plan started and up-to-date				
CM organization chart created				
CM team members trained to perform activities				
Configuration items identified and documented on the configuration item index				
Libraries established for configuration items				
Documented procedures exist for development				
and movement of configuration items in the libraries				
Project members trained in CM procedures for configuration item development				
Baselined configuration items protected				
Documented change control procedures exist for each type of configuration item				
Project members trained in CM change control procedures for the configuration items they are working with				
(Add additional checkpoints as needed)				

Updated: 11/27/01 Version: 1.0 Status: Draft

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Configuration Management (CM) Audit Checklist Template (page 2)

Configuration Items Reviewed

Document all configuration items reviewed during the audit.

Configuration Item Name	Location



Configuration Management (CM) Audit Checklist Template (page 3)

Document History

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